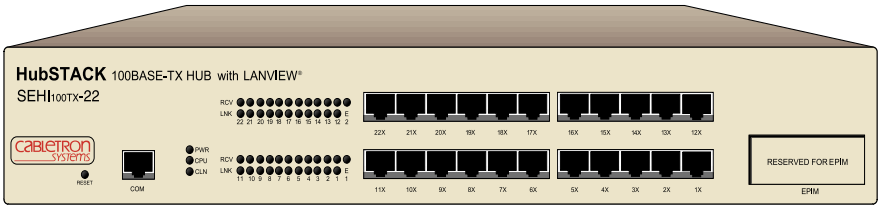
SEHI100TX-22 100BASE-T
INTELLIGENT STACKABLE HUB
USER'S GUIDE



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Manufacturer's Name:	**Cabletron Systems, Inc.**
Manufacturer's Address:	**35 Industrial Way** **PO Box 5005** **Rochester, NH 03867**
European Representative Name:	**Mr. J. Solari**
European Representative Address:	**Cabletron Systems Limited** **Nexus House, Newbury Business Park** **London Road, Newbury** **Berkshire RG13 2PZ, England**
Conformance to Directive(s)/Product Standards:	**EC Directive 89/336/EEC** **EC Directive 73/23/EEC** **EN 55022** **EN 50082-1** **EN 60950**
Equipment Type/Environment:	**Networking Equipment, for use in a Commercial or Light Industrial Environment.**

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

Manufacturer	Legal Representative in Europe
Mr. Ronald Fotino	Mr. J. Solari
Full Name	Full Name
Principal Compliance Engineer	Managing Director - E.M.E.A.
Title	Title
Rochester, NH, USA	Newbury, Berkshire, England
Location	Location

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CHAPTER 1
INTRODUCTION

Welcome to the Cabletron Systems **SEHI100TX-22 100BASE-T Intelligent Stackable Hub User's Guide**. This manual provides installation instructions, troubleshooting, and reference information for the SEHI100TX-22.

The term SEHI (Stackable Ethernet Hub with Intelligence) is used throughout this manual when describing the features and functions of the SEHI100TX-22.

1.1 USING THIS MANUAL

Read through this manual to gain an understanding of the features and capabilities of the SEHI. A general knowledge of Ethernet and IEEE 802.3u type data communications networks and their physical layer components is helpful when installing the SEHI.

Chapter 1, **Introduction**, outlines the contents and describes the objectives and conventions of this manual. This chapter also provides information about how to get help and concludes with a list of related manuals.

Chapter 2, **SEHI Features and Options**, briefly describes SEHI features and provides information about available options.

Chapter 3, **Installation Requirements and Specifications**, provides installation requirements, network guidelines, and SEHI specifications.

Chapter 4, **Installation**, contains instructions for installing the SEHI as a stackable or standalone hub.

Chapter 5, **Connecting to the Network**, explains how to connect the SEHI to the network using the various media types.

Chapter 6, **Troubleshooting**, describes how to use the LANVIEW LEDs to troubleshoot network problems.

Chapter 7, **Local Management**, describes how to use SEHI Local Management screens and the available commands.

Appendix A, **EPIM Specifications**, provides specifications, cabling information, and switch settings for the Ethernet Port Interface Modules.

Appendix B, **Image File Download Using OID Strings**, provides instructions for setting up a TFTP server and downloading an image file to the SEHI by setting specific MIB OID strings.

1.2 DOCUMENT CONVENTIONS

The following conventions are used throughout this document:

Note symbol. Calls the reader's attention to any item of information that may be of special importance.

Tip symbol. Conveys helpful hints concerning procedures or actions.

Caution symbol. Contains information essential to avoid damage to the equipment.

Electrical Hazard Warning symbol. Warns against an action that could result in personal injury or death due to an electrical hazard.

Warning symbol. Warns against an action that could result in personal injury or death.

1.3 GETTING HELP

If you need additional support related to this device, or if you have any questions, comments, or suggestions concerning this manual, contact Cabletron Systems Technical Support:

Phone	(603) 332-9400 Monday – Friday; 8 A.M. – 8 P.M. Eastern Time
CompuServe	GO CTRON from any ! prompt
Internet mail	support@ctron.com
FTP Login Password	ctron.com (134.141.197.25) *anonymous* *your email address*
BBS Modem setting	(603) 335-3358 8N1: 8 data bits, 1 stop bit, No parity
For additional information about Cabletron Systems products, visit our World Wide Web site: http://www.cabletron.com/	

Before calling Cabletron Systems Technical Support, have the following information ready:

- A description of the failure
- A description of any action(s) already taken to resolve the problem (e.g., changing mode switches, rebooting the unit, etc.)
- A description of your network environment (layout, cable type, etc.)
- Network load and frame size at the time of trouble (if known)
- The serial and revision numbers of all Cabletron Systems products in the network
- The device history (i.e., have you returned the device before, is this a recurring problem, etc.)
- Any previous Return Material Authorization (RMA) numbers

1.4 RELATED MANUALS

Use the Cabletron Systems *SEH100TX-22 100BASE-T User's Guide* to supplement the procedures and other technical data provided in this manual. The procedures contained in the *SEH100TX-22 100BASE-T User's Guide* are referenced where appropriate, but not repeated in this manual.

CHAPTER 2
SEHI FEATURES AND OPTIONS

This chapter provides an overview of the SEHI and contains sections detailing features and available options.

NOTE

The terms SEHI (Stackable Ethernet Hub with Intelligence) and SEH (Stackable Ethernet Hub) are used throughout this manual when describing the features and functions of the SEHI100TX-22 and the SEH100TX-22.

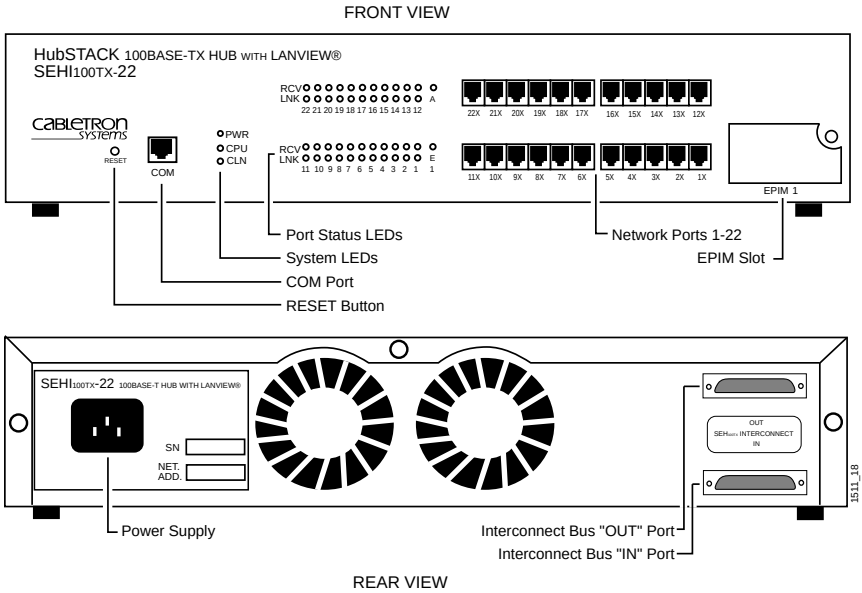


Figure 2-1 The SEHI100TX-22

2.1 SEHI OVERVIEW

The SEHI100TX-22 is an intelligent repeating hub providing 22 RJ45 ports and one Ethernet Port Interface Module (EPIM) port on the front panel for network connections. The SEHI has two rear panel HubSTACK Interconnect Bus ports for stackable connections. The SEHI100TX-22 can manage up to four of Cabletron Systems SEH100TX-22 non-intelligent stackable hubs.

The SEHI100TX-22 operates in a 100BASE-T Ethernet network. This product will NOT operate in a 10BASE-T environment. Connect the SEHI100TX-22 and SEH100TX-22 only to similar 100BASE-T products.

The SEHI100TX-22 supports the EPIM-100TX, EPIM-100FX, and the EPIM-100FMB. No other Cabletron Systems EPIMs operate in this device.

2.2 SEHI FEATURES

The SEHI operating features are as follows:

Repeater Functionality

The SEHI fully conforms to the IEEE 802.3u Repeater specifications. The SEHI transmits retimed data packets, regenerates the preamble, extends fragments, and arbitrates collisions.

The SEHI100TX-22 meets IEEE 802.3u Repeater Class I standards. Class I standards allow one repeater between any two Data Terminal Equipment (DTE) devices within a single collision domain (network).

The SEHI automatically partitions problem segments, and reconnects repaired segments to the network. This feature minimizes the impact on network operation resulting from a problem on one segment by isolating the problem segment. Only devices on the problem segment are affected. When the problem is solved, the SEHI automatically reconnects the isolated segment to the network.

Polarity Detection and Correction

Each twisted pair port on the SEHI incorporates a polarity detection and correction feature that allows the SEHI to pass data regardless of the polarity of the twisted pair segment's receive link.

FLASH EEPROMs

The SEHI uses FLASH EEPROMs that allow the downloading of new and updated firmware using Cabletron Systems SPECTRUM Element Manager/Windows or any device using BOOTP or TFTP protocols.

LANVIEW LEDs

Cabletron Systems LANVIEW status monitoring and diagnostics system is a troubleshooting tool that helps in diagnosing power failures, collisions, cable faults, and link problems. The LANVIEW LEDs are conveniently located on the SEHI front panel.

RESET Button

Resetting the hub with the front panel RESET Button reboots the SEHI and initializes the processor. Resetting the SEHI also resets all of the SEH non-intelligent hubs in the stack.

Local Management

Manage the SEHI and its attached segments through Local Management on the SEHI. Local Management provides full packet and error statistics for the entire stack, individual device, or individual port. Access Local Management by attaching a DEC VT320 terminal or a PC using VT320 emulation software to the RJ45 COM port on the SEHI. Cabletron Systems provides a UTP console cable with RJ45 connectors at each end, adapters for DB9 or DB25 connections and an instruction sheet with adapter pinout information with the SEHI. Chapter 7, **Local Management**, provides detailed information on setting up and managing your network through Local Management.

2.3 STACKABLE CAPABILITIES

The SEHI100TX-22 intelligent hub is designed to manage a stack of up to four Cabletron Systems SEH100TX-22 non-intelligent hubs. The SEHI is placed at the bottom of the stack. It manages all SEH hubs in the stack and provides full packet and error statistics for the entire stack, individual device, or individual port.

Stack up to four SEH non-intelligent hubs with one SEHI using the Cabletron Systems external HubSTACK Interconnect cables provided with each SEH. Stackable configurations make it possible to maintain only one IEEE repeater hop while providing up to 120 ports. Hubs can be added or removed from the stack without having to power down the entire stack.

2.4 RACK MOUNTING CAPABILITIES

The SEHI can be installed in a 19-inch rack. Cabletron Systems provides brackets and mounting screws with the SEHI. See Chapter 4, **Installation**, for complete rack mounting instructions.

2.5 REMOTE NETWORK MANAGEMENT

Manage the SEHI remotely with any SNMP network management system. Cabletron Systems offers the following remote management packages:

- Cabletron Systems SPECTRUM
- Cabletron Systems SPECTRUM Element Manager/Windows
- Cabletron Systems Remote SPECTRUM Portable Management Applications
- Third Party SNMP compliant Network Management Packages

2.6 OPTIONAL EPIMS

EPIMs are not included with the SEHI, but can be purchased separately from Cabletron Systems.

EPIMs enable the expansion of a network through different types of media. Cabletron Systems offers three optional EPIMs for the SEHI100TX-22 and the SEH100TX-22 as shown in Table 2-1.

Table 2-1 100BASE-TX/FX/FMB EPIMs

EPIM	Media Type	Connector
EPIM-100TX	Category 5 UTP Cable	RJ45
EPIM-100FX	Multimode Fiber Optic Cable	SC
EPIM-100FMB for buffered uplinks	Multimode Fiber Optic Cable	SC

CHAPTER 3

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

This chapter describes cabling requirements, network guidelines, and operating specifications for the SEHI100TX-22.

The network must meet the requirements and conditions specified in this chapter to obtain satisfactory performance from this equipment. Failure to follow these guidelines could result in poor network performance.

3.1 CABLE SPECIFICATIONS

The front panel SEHI100TX-22 network ports support Category 5 Unshielded Twisted Pair (UTP) cabling. Ethernet Port Interface Modules (EPIMs) expand the network using UTP (EPIM-100TX) or multimode fiber optic (EPIM-100FX or EPIM-100FMB) cabling. For information concerning the three EPIM types, refer to Appendix A. The rear panel Interconnect Bus ports support Cabletron Systems Interconnect cables for stackable applications.

Take care in planning and preparing the network cabling and connections. The quality of the connections and the length of cables are critical factors in determining the reliability of the network. The following sections describe specifications for each media type.

3.1.1 HubSTACK Interconnect Cable Requirements

Attach the SEHI to the stacked SEH modules with the HubSTACK Interconnect cables provided with each SEH and available only from Cabletron Systems (P/N 9380209). The cable attaches to the SEHI rear panel bus “OUT” port. The SEHI must be placed at the bottom of the stack. Stack up to four SEH hubs together with one SEHI.

3.1.2 UTP Cable Specifications

The device at the other end of the twisted pair segment must meet IEEE 802.3u 100BASE-T specifications. When connecting a 100BASE-TX Twisted Pair Segment to the SEHI twisted pair network ports and the EPIM-100TX module, the network must meet the following requirements:

Length

The IEEE 802.3u 100BASE-T standard requires that 100BASE-TX devices be able to transmit over a 100 meter (328 foot) link using Category 5 UTP wire. The cable used must meet the Horizontal requirements and 90-meter length limitations. Patch cable should be used on each end of the Horizontal wire to make connections to punch down blocks, panels, and other connecting devices. The combined lengths of the patch cords must not exceed 10 meters so the total segment length does not exceed 100 meters (328 feet).

Category 5 cables are marked on the cable jacket as Cat 5, Category 5, Level 5, Level V, or an equivalent.

Impedance

UTP cables typically have an impedance of between 85 to 110 ohms.

Jitter

Intersymbol interference and reflections cause jitter in the bit cell timing, resulting in data errors. A 100BASE-TX link must not generate more than 1.4 ns of jitter. If the cable meets the impedance requirements for a 100BASE-TX link, jitter should not be a concern.

Crosstalk

Crosstalk is caused by signal coupling between the different cable pairs contained within a multi-pair cable bundle. 100BASE-TX transceivers are designed so that the user does not need to be concerned about cable crosstalk, provided the cable meets all other requirements.

Noise

Noise is caused by either crosstalk or externally induced impulses. Impulse noise may cause data errors if the impulses occur at very specific times during data transmission. Generally, the user need not be concerned about noise. If noise-related data errors are suspected, it may be necessary to either reroute the cable or eliminate the source of the impulse noise.

Propagation Delay

Propagation delay is the amount of time it takes data to travel from the sending device to the receiving device. Total propagation delay allowed for the network is 256 bit times (2.56 µs) in one direction (5.12 µs round trip). If the total propagation delay between any two nodes on the network exceeds 2.56 µs, then use bridges or other devices to further segment the network.

Temperature

The attenuation of PVC insulated cable varies significantly with temperature. At temperatures greater than 40°C (104°F), Cabletron Systems recommends the use of plenum-rated cables to ensure that cable attenuation remains within specification.

3.1.3 Multimode Fiber Optic Cable Specifications

The SEHI supports the Cabletron Systems EPIM-100FX and EPIM-100FMB. These EPIMs meet IEEE 802.3u standards. When connecting a fiber optic segment to the SEHI EPIM-100FX or EPIM-100FMB module, the network must meet the following requirements:

Cable Loss

Test the fiber optic cable with a fiber optic attenuation test set adjusted for an 850 nm wavelength. This test verifies that the signal loss in a cable is within an acceptable level. The maximum loss for a multimode fiber optic cable is 11.0 dB.

Fiber Optic Budget and Propagation Delay

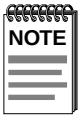
Determine the maximum fiber optic cable length by calculating the fiber optic budget delay and total network propagation before fiber optic cable runs are incorporated in any network design.

Fiber optic budget is the combination of the optical loss due to the fiber optic cable, in-line splices, and fiber optic connectors.

Propagation delay (collision delay) is the amount of time it takes data to travel from the sending device to the receiving device. Total propagation delay allowed for the entire network is 256 bit times (2.56 µs) in one direction (5.12 µs round trip). If the total propagation delay between any two nodes on the network exceeds 2.56 µs, then use bridges or other devices to further segment the network.

3.2 NETWORK CABLE LENGTHS

This section details the maximum network cable lengths specified by the IEEE 802.3u standard for a Class I repeater. As stated previously, the physical size of the network is limited primarily by propagation delay. The round trip delay cannot exceed 512 bit times or 5.12 µs.



A stack of five SEH hubs or four SEH hubs and one SEHI hub is equivalent to one repeater.

A 100BASE-T network might use all UTP links, all fiber links or a combination of both. Figure 3-1 shows a simplified example of a network with one Class I repeater. Link segments A and B represent the longest links in the network. In this case, if both segment A and segment B are UTP, each segment may be up to 100 meters long for a maximum network length of 200 meters. If segment A is UTP and segment B is fiber optics, the maximum length of the network is 263 meters (with a maximum UTP segment length of 100 meters). If both segments A and B are multimode fiber optics, the maximum length is 274 meters.

If a buffered uplink (EPIM-100FMB) is used, the collision domain is stopped at the EPIM slot. This allows a full length fiber optic link of 400 meters to be used as an uplink while maintaining 100-meter UTP and 400-meter fiber optic lengths to desktops. So if segment A, shown in Figure 3-1, is UTP and segment B is fiber optics, the maximum length of the network is 500 meters. If both segments are fiber optics, the maximum length is 800 meters.

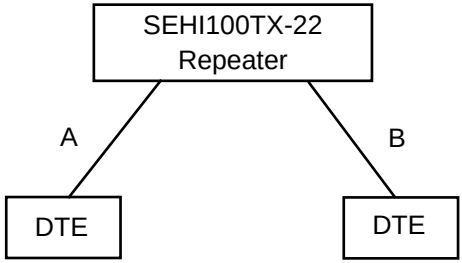


Figure 3-1 Class I Network

Table 3-1 summarizes the maximum link lengths for each type and combination of cable when used with a Class I repeater.

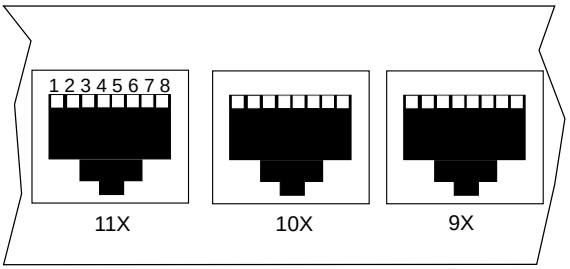
The maximum length of an individual UTP segment may be no more than 100 meters.

Table 3-1 Maximum Class I Network Cable Length

Number of Repeaters	UTP	UTP & Multimode Fiber Optics	Multimode Fiber Optics	UTP & Buffered EPIM	Fiber Optics & Buffered EPIM
1	200 m	263 m	274 m	500 m	800 m

3.3 NETWORK PORT SPECIFICATIONS

The SEHI network ports use shielded RJ45 connectors that support UTP cabling. Figure 3-2 shows the RJ45 pinouts.



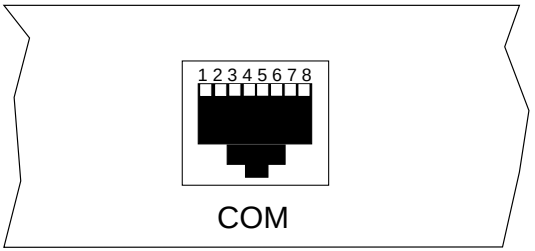
1. Receive +
2. Receive -
3. Transmit +
4. Not Used
5. Not Used
6. Transmit -
7. Not Used
8. Not Used

09162_02

Figure 3-2 RJ45 Network Port Pinouts

3.4 COM PORT REQUIREMENTS

The RJ45 COM port supports access to a Local Management Console. The COM port supports a Digital Equipment Corporation VT320 terminal or PC emulation of the VT320 terminal. Figure 3-3 shows the pinouts for the RJ45 COM port.



1. Transmit Data
2. Data Carrier Detect
3. Data Set Ready
4. Receive Data
5. Signal Ground
6. Data Terminal Ready
7. Request To Send
8. Clear To Send

1511_15

Figure 3-3 RJ45 COM Port Pinouts

3.5 OPERATING SPECIFICATIONS

The operating specifications for the SEHI100TX-22 are described in this section. Cabletron Systems reserves the right to change these specifications at any time without notice.

3.5.1 Power Supply Requirements

The SEHI uses a universal power supply. The input requirements are listed in Table 3-2.

Table 3-2 Power Supply Requirements

Line Input Range Volts (V)	Current Amperes (A)	Frequency Hertz (Hz)
100–125 Vac	4.0 A	50/60 Hz
200–250 Vac	2.0 A	

3.5.2 Environmental Requirements

This section details the environmental requirements of the SEHI.

Operating Temperature: 5°C to 40°C (41°F to 104°F)

Storage Temperature: -30°C to 73°C (-22°F to 164°F)

Operating Humidity: 15% to 90% (non-condensing)

3.5.3 Agency Approvals

The safety, emission, and immunity approvals for the SEHI are detailed in this section.

Safety

This unit meets the safety requirements of UL 1950, CSA C22.2 No. 950, IEC 950 and EN 60950.

Emissions

This unit meets the emission requirements of FCC Part 15 Class A, EN 55022 Class A and VCCI Class I.

Immunity

This unit meets the immunity requirements of EN 50082-1 including IEC 801-2 (ESD), IEC 801-3 (Radiated Susceptibility), and IEC 801-4 (EFT/B).

3.6 PHYSICAL SPECIFICATIONS

This section details the physical specifications for the SEHI.

Dimensions (H x W x D):	2.8 in x 17.0 in x 13.5 in (7.2 cm x 43.6 cm x 34.6 cm)
Weight:	7 lb (3.15 kg)

CHAPTER 4
INSTALLATION

This chapter outlines the procedure for attaching the SEHI to the network as a stackable or standalone device. Ensure that the network meets the guidelines and requirements outlined in Chapter 3, **Installation Requirements and Specifications**, before installing the SEHI.

A single phase grounded power receptacle that meets the requirements listed in Chapter 3 must be located within seven feet of the installation.

Failure to follow installation instructions may result in an electrical shock hazard.

4.1 UNPACKING THE SEHI

Unpack the SEHI as follows:

1. Remove the shipping material covering the SEHI in the shipping box.
2. Carefully remove the SEHI from the shipping box and set it aside to prevent damage.
3. Visually inspect the SEHI. If there are any signs of damage, contact Cabletron Systems Technical Support immediately. Refer to Section 1.3 for instructions on getting help.
4. Read the SEHI Release Notes included in the shipping box.

Cabletron Systems includes a 3 1/2-inch disk with the SEHI100TX-22 that contains a backup copy of the FLASH Firmware Image File. Download the file to the SEHI100TX-22 if the existing image becomes corrupted. Refer to Appendix B for detailed download instructions.

4.2 PRE-INSTALLATION CHECKOUT

The SEHI is equipped with an NVRAM reset switch (Figure 4-1) located behind the grillwork on the side of the hub. Ensure that this switch is in the **DOWN** position by looking in through the grillwork on the right side of the hub. If the switch is UP, move it into the DOWN position with a **non-metallic** tool. Do not remove the chassis cover to perform this operation. Leaving the switch in the UP position results in user-installed parameters such as IP address and Community Names being cleared from NVRAM whenever the SEHI loses power and/or is reset. Refer to Section 6.4 for detailed instructions on setting the NVRAM switch.

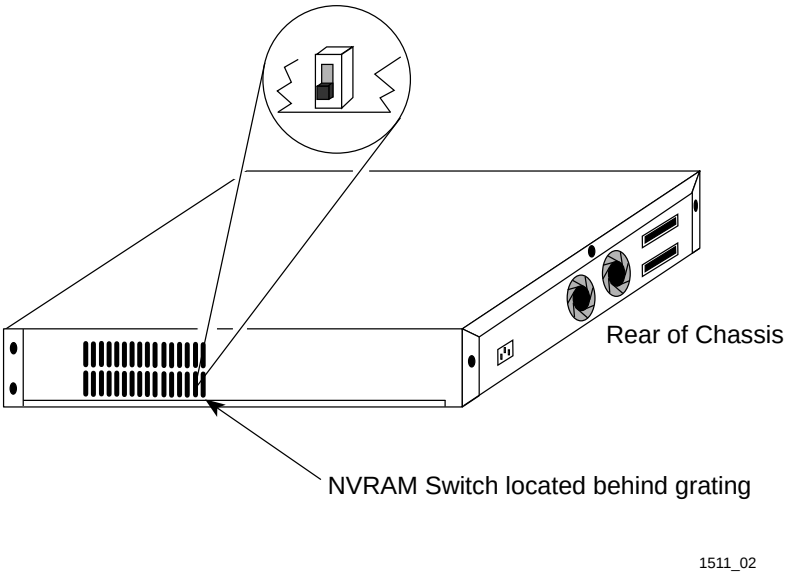


Figure 4-1 NVRAM Switch Location

The SEHI may be installed on a tabletop or shelf, or in a 19-inch rack, and configured as a standalone or stacked hub.

Refer to Section 4.3 for information concerning a tabletop or shelf installation. Section 4.4 describes the rackmount installation.

4.3 TABLETOP OR SHELF INSTALLATION

This section provides guidelines for installation on a tabletop or shelf.

Tabletop and shelf installations must be within reach of the network cabling and meet the requirements listed below:

- In a shelf installation, the shelf must be able to support 30 pounds of static weight for each device in the stack.
- Maintain a temperature of between 5°C (41°F) and 40°C (104°F) at the installation site with fluctuations of less than 10°C per hour.

The SEHI must be located within seven feet of its power source and with an unrestricted free surface area as shown in Figure 4-2.

In order to allow for proper cooling, there must be a two-inch clearance on either side and the back of the unit.

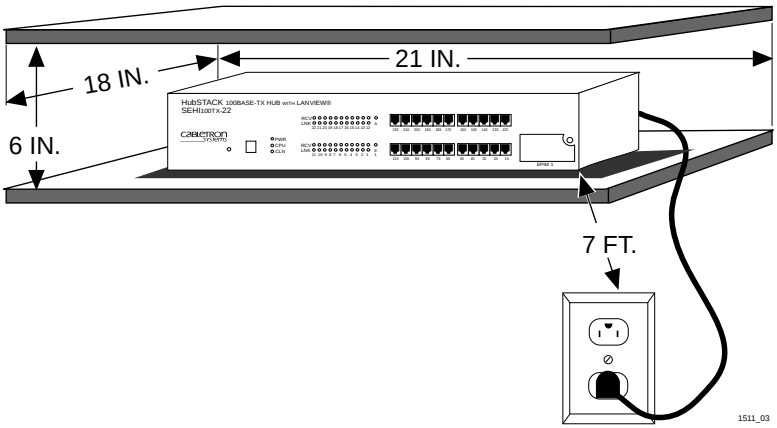


Figure 4-2 Tabletop or Shelf Installation

Proceed to Section 4.5, **Powering Up and Stacking the SEHI**.

4.4 RACKMOUNT INSTALLATION

To install the SEHI in a 19-inch rack, Cabletron Systems provides a kit with the SEHI that includes rackmount brackets, mounting screws, and a strain-relief bracket for cable management.

Rack mounting the SEHI involves the following:

- Attaching the strain-relief bracket
- Rack mounting the SEHI
- Stacking the SEHI when applicable

Before installing the SEHI into a rack, ensure that the rack can support the device(s) without compromising the stability of the rack. Otherwise, personal injury and/or equipment damage may result.

Attaching the Strain-Relief Bracket

Attach the strain-relief bracket to the front of the SEHI as follows:

1. Locate the strain-relief bracket and four 8-32 x 3/8-inch pan-head screws from the rackmount kit.

Do **NOT** attempt to attach the strain-relief bracket with screws other than the 8-32 x 3/8-inch screws included with the SEHI. Use of longer screws may damage the unit or cause electrical shock.

2. Attach the strain-relief bracket to the bottom of the SEHI (Figure 4-3).

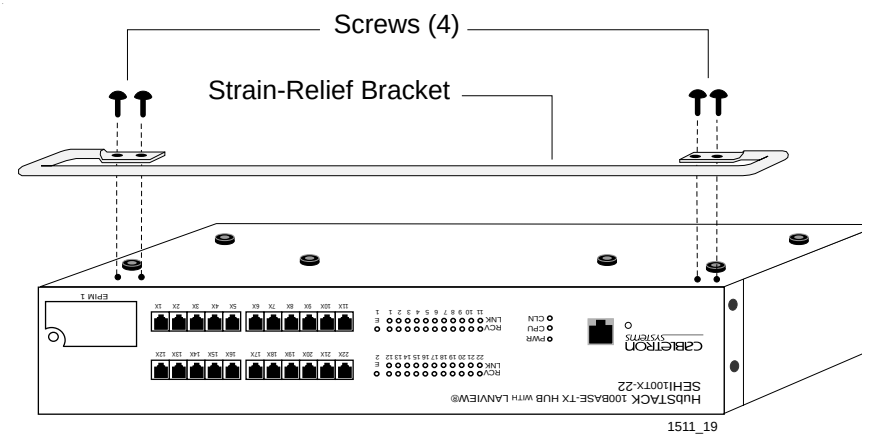


Figure 4-3 Attaching the Strain Relief Bracket

Rack Mounting the SEHI

Refer to Figure 4-4 and proceed as follows to install the SEHI into a 19-inch rack.

1. Remove the four cover screws (two from each side) located along the front edges of each side of the SEHI.

Do not remove the cover from the SEHI100TX-22. Do not remove any other screws from the unit.

2. Using the four 6-32 x 3/8-inch replacement flathead cover screws provided in the rackmount kit, attach the rack mounting brackets to each side of the SEHI.

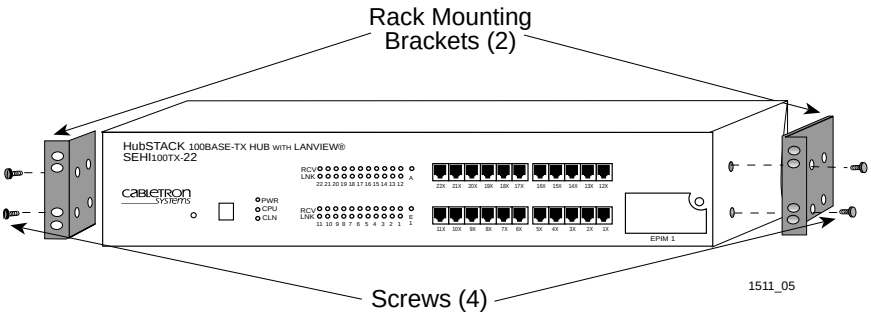


Figure 4-4 Installing the Rack Mounting Brackets

3. Ensure that the rack used will support the unit, and that the rack will remain stable with the unit installed in it. Support the SEHI securely from underneath, and align the mounting brackets of the SEHI chassis with the screw holes in the equipment rack as shown in Figure 4-5. Fasten the SEHI to the equipment rack securely.

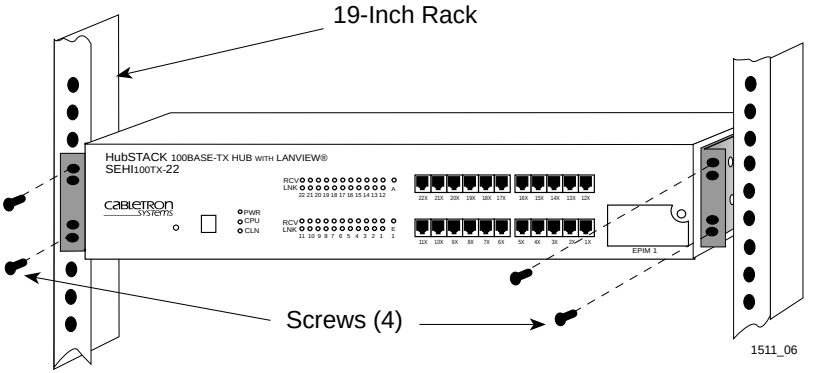


Figure 4-5 Installing the SEHI in the Rack

The cooling fans at the rear panel of the SEHI must have adequate clearance (**two inches on either side and in the rear**) for unrestricted air flow. The temperature for the selected location must be maintained between 5°C and 40°C, and fluctuate less than 10°C per hour.

Proceed to Section 4.5, **Powering Up and Stacking the SEHI**.

4.5 POWERING UP AND STACKING THE SEHI

The following section details the procedures that **must** be followed to power up and interconnect stacked hubs.

Failure to follow this procedure may result in damage to the equipment.

If you are using an intelligent hub (SEHI) to manage the stack, you must locate the SEHI at the bottom of the stack.

The SEHI must be completely powered up and initialized before powering up and interconnecting the rest of the stack.

The SEH and the SEHI have universal power supplies that allow connection to power sources from 100 Vac to 125 Vac @ 4.0 A or 200 Vac to 250 Vac @ 2.0 A, 50/60 Hz.

1. Power up the SEHI by plugging the power cord into the back panel of the SEHI and plugging the other end into a grounded receptacle.

Locate the SEHI at the bottom of the stack.

For management purposes, stacked hubs are always numbered from 1 to 5 starting at the bottom.

2. Verify that the PWR LED is on, indicating that the SEHI is receiving power. After the SEHI runs a self test and completes the boot process successfully, the CPU LED blinks green indicating normal operation. If the LED remains red, the processor is faulty; contact Cabletron Systems Technical Support. Do not proceed with the following steps until the CPU LED is a steady blinking green.

Do NOT power up or interconnect any other hubs in the stack until the SEHI has successfully completed the boot process.

3. Power up the SEH above the SEHI in the stack by plugging the power cord into the back panel of the SEH and plugging the other end into a grounded receptacle.
4. Verify that the **PWR** LED is on, indicating that the SEH is receiving power.

CAUTION

Do NOT connect the interconnect cable between the SEH and the SEHI before powering up the SEH. Otherwise damage to the SEH may result.

5. Attach the HubSTACK Interconnect cable provided with the SEH to the "IN" port on the rear panel of the SEH as shown in Figure 4-6.
6. Attach the other end of the interconnect cable to the "OUT" port on the rear panel of the hub at the bottom of the stack.

CAUTION

Do not leave an interconnect cable connected at only one end during network operation. Corrupted data may result.

7. Repeat steps 3 through 6 until all SEH hubs are connected.

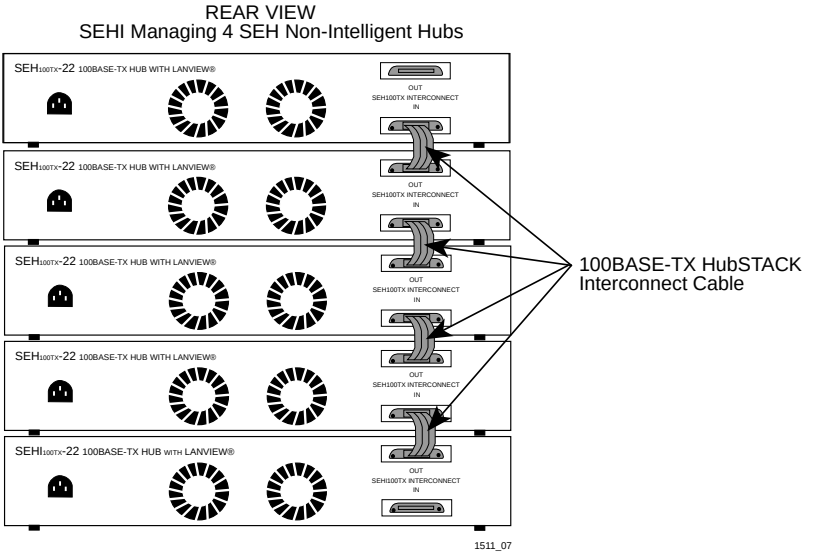


Figure 4-6 Stacking the SEHI

4.6 INSTALLING AN EPIM

This section contains procedures on how to install the EPIM-100TX, EPIM-100FX, or the EPIM-100FMB to upgrade or change the capabilities of your SEHI. After installing a new EPIM, refer to the appropriate EPIM section in Appendix A to verify proper operation.

Observe all static precautions while handling an EPIM.

Install an EPIM-100TX, EPIM-100FX, or an EPIM-100FMB as follows:

When removing an EPIM, pull the module straight out to prevent damage to the connector.

1. Remove the coverplate or the existing EPIM (whichever applies).
2. Slide the new EPIM into place, making sure that the connectors on the rear of the EPIM align correctly and firmly with the connector inside the SEHI. Refer to Figure 4-7.
3. Install the mounting screw.

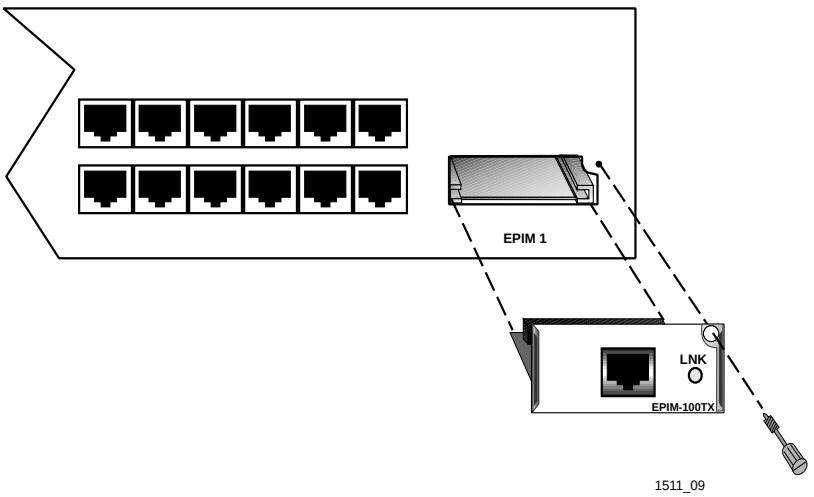


Figure 4-7 Installing an EPIM

CHAPTER 5
CONNECTING TO THE NETWORK

This chapter outlines the procedure for connecting the SEHI to a network. Ensure that the network meets the guidelines and requirements outlined in Chapter 3, **Installation Requirements and Specifications**, before installing the SEHI.

5.1 CONNECTING THE SEHI TO THE NETWORK

The procedure for connecting network segments to the SEHI varies depending on the media and ports being connected. Refer to the following list and perform the procedure described in the subsections that apply to connecting the SEHI to a network:

- Network Ports Section 5.1.1
- EPIM-100TX Section 5.1.2
- EPIM-100FX or EPIM-100FMB Section 5.1.3

Prior to connecting the network cabling, check the connectors for the proper pinouts as shown in Chapter 3.

5.1.1 Connecting to Network Ports

Attach UTP segments to the RJ45 network ports on the front panel of the SEHI. Each RJ45 network port on the SEHI incorporates a polarity detection and correction feature. The polarity detection and correction feature allows the SEHI to pass data regardless of the polarity of the twisted pair segment's receive link. Operating in this condition is not recommended; the segment should be removed from the network and wired correctly by a technician.

Connect the twisted pair segments to the SEHI as follows:

1. Plug the RJ45 connector from each twisted pair segment into the desired network port on the SEHI. See Figure 5-1.
2. Plug the RJ45 connector at the other end of the twisted pair segment into the other device as appropriate.

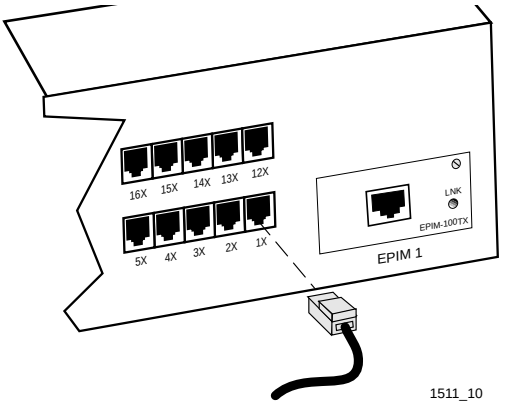


Figure 5-1 SEHI Network Ports

3. Check that the applicable **LNK** LED for the port is on. If the LED is off, perform each of the following steps until it is on:

   a. Check that the 100BASE-TX device at the other end of the twisted pair segment is powered up.

   b. Verify that the RJ45 connector on the twisted pair segment has the proper pinouts.

   c. Check the cable for continuity.

   d. Check that the twisted pair connection meets the cable specifications outlined in Section 3.1.2.

If a link is not established, contact Cabletron Systems Technical Support.

5.1.2 Connecting to an EPIM-100TX

The EPIM-100TX is often used to provide a connection between the SEHI and a bridge, router, or switch. Normally, in this configuration, a "straight-through" cable is used and the EPIM crossover switch shown in Figure 5-2 is set to "not crossed over."

The EPIM-100TX is also used to provide another RJ45 port to connect to a UTP segment. Before connecting a segment to the EPIM-100TX, check each end of the segment to determine if the wires have been crossed over for the proper connection. If the wires do not cross over, use the switch on the EPIM-100TX to internally cross over the RJ45 port. Refer to Figure 5-2 to properly set the EPIM-100TX crossover switch.

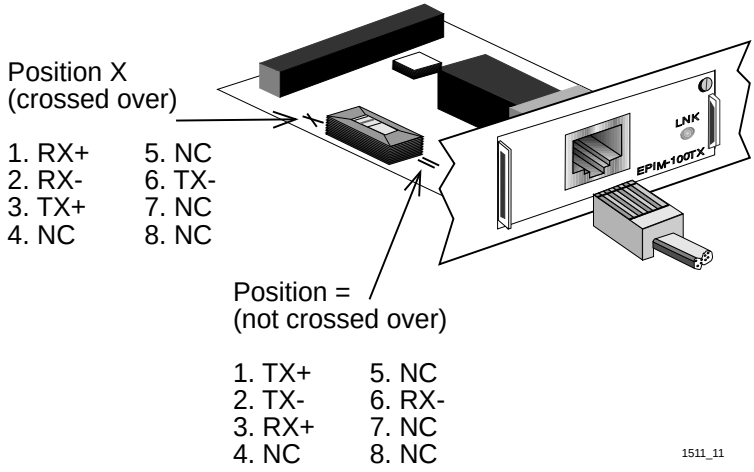


Figure 5-2 EPIM-100TX Crossover Switch

Connect an EPIM-100TX to a twisted pair segment as follows:

1. Connect the twisted pair segment to the module by plugging the RJ45 connector on the twisted pair segment into the RJ45 port on the module. See Figure 5-2.
2. Plug the RJ45 connector at the other end of the twisted pair segment into the other device as appropriate.
3. Check that the **LNK** LED on the EPIM-100TX is on. If the LED is off, perform each of the following steps until it is on:
   a. Check that the 100BASE-TX device at the other end of the twisted pair segment is powered up.
   b. Verify that the RJ45 connector on the twisted pair segment has the proper pinouts.
   c. Check the cable for continuity.
   d. Check that the twisted pair connection meets the cable specifications outlined in Section 3.1.2.
   e. Check that the crossover switch is in the correct position.

If a link is not established, contact Cabletron Systems Technical Support.

5.1.3 Connecting to an EPIM-100FX or EPIM-100FMB

The EPIM-100FX and EPIM-100FMB have an SC style network port (see Figure 5-3). Cabletron Systems supplies fiber optic cables using SC connectors that are keyed to ensure proper crossover of the transmit and receive fibers.

An odd number of crossovers (preferably one) must be maintained between devices so that the transmit port of one device is connected to the receive port of the other device and vice versa.

Use the following steps to connect a fiber segment to the SEHI:

1. Remove the protective plastic covers from the fiber optic ports on the module port and from the ends of the connectors.

Do not touch the ends of the fiber optic strands, and do not let the ends come in contact with dust, dirt, or other contaminants. Contamination of the ends causes problems in data transmissions. If the ends become contaminated, clean them with alcohol using a soft, clean, lint free cloth.

2. Insert one end of the SC connector into the EPIM-100FX or EPIM-100FMB on the SEHI. See Figure 5-3.

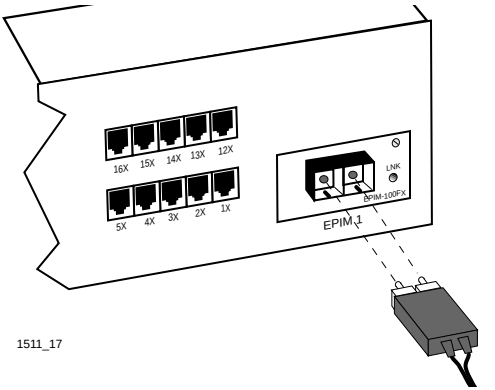


Figure 5-3 EPIM-100FX or EPIM-100FMB Port

3. At the other end of the fiber optic cable, attach the SC connector to the other device.

4. Check that the EPIM-100FX (or EPIM-100FMB) **LNK** LED is on. If the LED is off, perform the following steps until it is on:

    a. Check that the power is turned on for the device at the other end of the link.

    b. Verify that there is a proper crossover of fiber optic strands between the applicable port on the SEHI and the fiber optic device at the other end of the fiber optic link segment.

    c. Verify that the fiber optic connection meets the dB loss specifications outlined in Section 3.1.3.

If a link is not established, contact Cabletron Systems Technical Support.

5.2 TESTING THE INSTALLATION

The SEHI00TX-22 is now ready for operation. Before placing the network into service, test that all stations can be addressed and that the SEHI and all stations are indicating normal operation. Ensure that the networking software is configured properly to match the installed network. If there are any errors or abnormal operation, proceed to Chapter 6, **Troubleshooting**.

CHAPTER 6
TROUBLESHOOTING

This chapter contains instructions for using LANVIEW LEDs to troubleshoot physical layer network problems. It also describes how to reset the SEHI and how to reset the NVRAM switch.

6.1 INSTALLATION TEST

After connecting the SEHI to the network, verify that packets pass between all Ethernet devices connected to the SEHI and any other devices connected to the network. If there is a problem with any of the attached devices, check the link as follows:

1. Check that the **LNK** LED, if applicable, for the port is on. If the LED is off, perform each of the following steps until the LED is on:

    a. Check that the 100BASE-TX device at the other end of the twisted pair segment is powered up.

    b. Verify that the connector on the twisted pair segment has the proper pinouts. Refer to Chapter 3 for the pin assignments for twisted pair connectors.

    c. For the EPIM-100FX or EPIM-100FMB, check that the TX and RX strands are properly connected.

    d. Check the cable for continuity. Several tools are available for this test, depending on the media used.

    e. Check that the twisted pair segments or fiber optic segments meet cable specifications as described in Chapter 3.

2. If the remote station is ready and the **LNK** LED is on, but no data passes through the port, one of two conditions may exist:

    - Network management has disabled the port. Correct this condition by enabling the port through network management.
    - The port is segmented either because the collision detector was on for more than 110 μs or the SEHI detected more than 32 consecutive collisions on the attached segment. The affected port remains segmented until a good packet is transmitted/received without collisions.

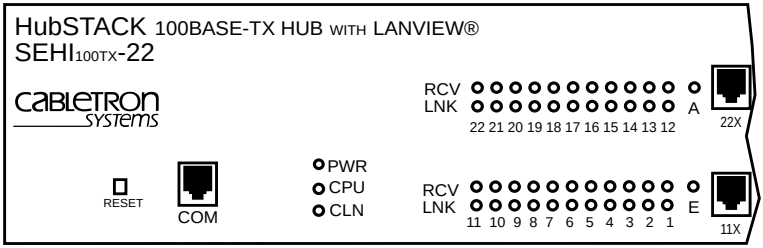
If the **LNK** LED is still not on, contact Cabletron Systems Technical Support. Refer to Section 1.3 for instructions about getting help.

6.2 USING LANVIEW

The SEHI incorporates the Cabletron Systems LANVIEW status monitoring and diagnostics system. LANVIEW LEDs help diagnose problems such as power failure or cable fault. The SEHI includes the following LANVIEW LEDs:

- **PWR**, for power status
- **CPU**, for board status
- **RCV** (Receive), **LNK** (Link), and **CLN** (Collision) for Ethernet status

Figure 6-1 provides a quick reference chart of LED locations and definitions. This chapter also includes a detailed description of each LED.



LED NAME	LED COLOR	DEFINITION
PWR (Power)	Off Green (Solid)	No power Power
CPU (Central Processing Unit)	Off Green (Flashing) Green (Blinking) Red (Solid)	CPU in BOOT process CPU initializing CPU functioning CPU not functioning
CLN (Collision)	Red (Flashing)	Collision
RCV (Receive)	Yellow (Flashing) Off	SEHI is receiving data No activity
LNK (Link)	Green Off	Link established No link

1511_13

Figure 6-1 LANVIEW LEDs

Flashing indicates an irregular LED pulse.

Blinking indicates a steady LED pulse.

PWR

When this green LED is on, it indicates that the SEHI is receiving power. If this LED is off, it indicates a loss of input power. Check that the power cord is properly plugged into the SEHI and the ac input power source (circuit breaker, fuse, etc.). If the proper source power is present, the problem could be with the SEHI.

CPU

This LED alternates from red to green to during power up. After the boot is complete, the LED blinks green. A blinking green LED indicates normal operation. A red LED indicates a faulty processor.

CLN

When this red LED flashes, it indicates that a collision has occurred on one of the ports.

RCV

When a yellow RCV LED flashes, it indicates that the SEHI is receiving data packets from the associated port segment. Each SEHI port has a corresponding RCV LED:

- Network Ports: RCV LEDs 1-22
- EPIM 1: RCV LED E
- Management: RCV LED A

LNK

When a green LNK LED is on, it indicates an established link between the associated port and the device at the other end of the segment. The LNK LED remains on as long as a link is maintained. Each SEHI Network Port (ports 1 through 22) has a corresponding LNK LED.

6.3 USING THE RESET BUTTON

The SEHI incorporates a recessed RESET button. See Figure 6-1. The RESET button initializes the SEHI processor. This button does NOT initialize Non-Volatile Random Access Memory (NVRAM), the nonvolatile random access memory where the SEHI stores network management parameters.

To use the RESET button, use a pen or pencil to press the button. When this is done, the SEHI initializes itself.

All modules in a stacked configuration reset when the SEHI is reset.

6.4 SETTING THE NVRAM SWITCH

To prevent the possibility of electrical shock, **do not** remove the chassis cover to access the NVRAM switch, and use only a **non-metallic** tool when moving the NVRAM switch.

The SEHI uses NVRAM to store user-entered parameters such as IP address and Community Names. To reset these parameters to the factory defaults, refer to Figure 6-2 and perform the following steps:

1. With the power ON and using a **non-metallic** tool, move the NVRAM switch to the UP position.
2. Press the RESET switch located on the front panel.
3. Wait until the unit boots (approximately 12 seconds).
4. Return the NVRAM switch to the DOWN position.

CAUTION

Failure to return the NVRAM switch to the DOWN position will result in loss of user-entered parameters upon power shutdown and restart. The SEHI will clear NVRAM if the unit is restarted with the switch in the UP position.

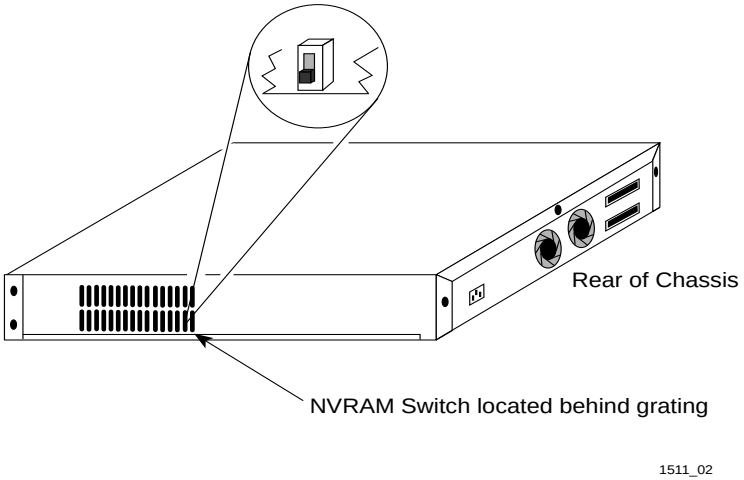


Figure 6-2 NVRAM Switch Location

CHAPTER 7
LOCAL MANAGEMENT

This chapter explains how to set up a management terminal to access the SEHI Local Management. It also explains how to use the Local Management screens and commands.

Local Management supplies the tools to manage the SEHI and all of its attached segments. It allows the user to perform the following tasks:

- Assign an IP address and subnet mask.
- Select a default gateway.
- Control access to the SEHI through the community names established in the Community Name Table.
- Designate which Network Management Workstations receive trap messages from the device.
- Navigate through the Management Information Base (MIB) and manage the objects within it from a remote location. Given the appropriate security level, the MIB is accessible from the SEHI through SNMP Tools.

Local Management also allows the user to manage each non-intelligent stackable hub attached to the SEHI, and provides a Statistics screen to view error, collision, and traffic statistics for the entire stack, individual module, or individual port.

7.1 KEYBOARD CONVENTIONS

All key names appear in this manual as capital letters. For example, the enter (return) key appears as ENTER and the space bar appears as SPACE bar. Table 7-1 explains the keyboard conventions used in this manual as well as the key functions.

Table 7-1 Keyboard Conventions

Key	Function
RETURN Key and ENTER Key	These are selection keys that perform the same Local Management function. For example, “Press ENTER” means press either ENTER or RETURN, unless this manual specifically instructs you otherwise.
SPACE Bar and BACKSPACE Key	These keys cycle through selections in some Local Management fields. Use the SPACE bar to cycle forward through selections and use BACKSPACE to cycle backward through selections.
Arrow Keys	These are navigation keys. Use the UP-ARROW, DOWN-ARROW, LEFT-ARROW, and RIGHT-ARROW keys to move the screen cursor. For example, “Use the arrow keys” means to press whichever arrow key moves the cursor to the desired field on the Local Management screen.

7.2 MANAGEMENT TERMINAL SETUP

Use one of the following systems to access Local Management:

- A Digital Equipment Corporation VT series terminal
- A VT type terminal running emulation programs for the Digital Equipment Corporation VT series
- An IBM or compatible PC running a VT series emulation software package

An RJ45 console cable is required to attach the management terminal to the SEHI. The console cable is included with the SEHI in a package that contains the following:

- UTP console cable with RJ45 connectors on each end
- Adapters for DB9 or DB25 connections
- Instruction sheet

The following sections explain how to attach the console cable and set up the management terminal. Refer to the ***RJ45 Cable Kit Instruction Sheet*** for adapter pinouts and additional information.

Console Cable Configuration

Use the RJ45 Cable Kit provided with the SEHI to attach the management terminal to the SEHI COM port as shown in Figure 7-1.

Connect the console cable to the SEHI as follows:

1. Attach the male RJ45 connector to the COM port of the SEHI.
2. Attach the female end (25-pin or 9-pin, as applicable) to the COM port on the terminal.

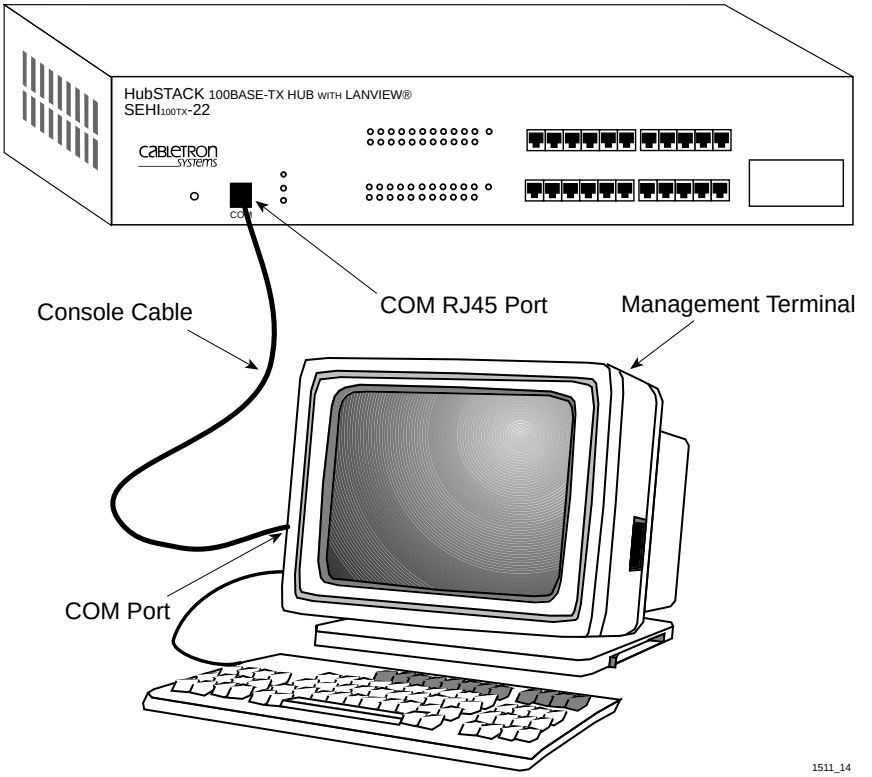


Figure 7-1 Management Terminal Connection

Management Terminal Setup Parameters

Table 7-2 lists the setup parameters for the local management terminal. If the terminal is a Digital Equipment Corporation VT320 terminal, press **F3** to access the Setup Directory. If the local management terminal uses terminal emulation of the VT320, refer to the equipment user manual for setup procedures.

Table 7-2 Terminal Setup Parameters

Menu	Function	Selection
Display Setup:	Columns	80 Columns
	Controls	Interpret Controls
	Auto Wrap	No Auto Wrap
	Test Cursor	Cursor
General Setup:	Mode	7 Bit Control
	Cursor Keys	Normal Cursor Keys
Communications Setup:	Transmit	Transmit = 9600
	Receive	Receive = Transmit
	XOFF	any option
	Bits, Parity	8 Bits, No Parity
	Stop Bit	1 Stop Bit
	Local Echo	No Local Echo
	Port	DEC-423, Data Leads Only
	Transmit	any option
	Auto Answerback	No Auto Answerback
Keyboard Setup:	Auto Repeat	any option
	Keyclick	any option
	Margin Bell	Margin Bell
	Warning Bell	Warning Bell
	Auto Answerback	No Auto Answerback

7.3 ACCESSING LOCAL MANAGEMENT

After configuring the local management terminal and properly attaching the cables to the SEHI, access the Local Management interface.

Use the following steps to access Local Management:

1. Power up the terminal. The Password screen (Figure 7-2) appears.

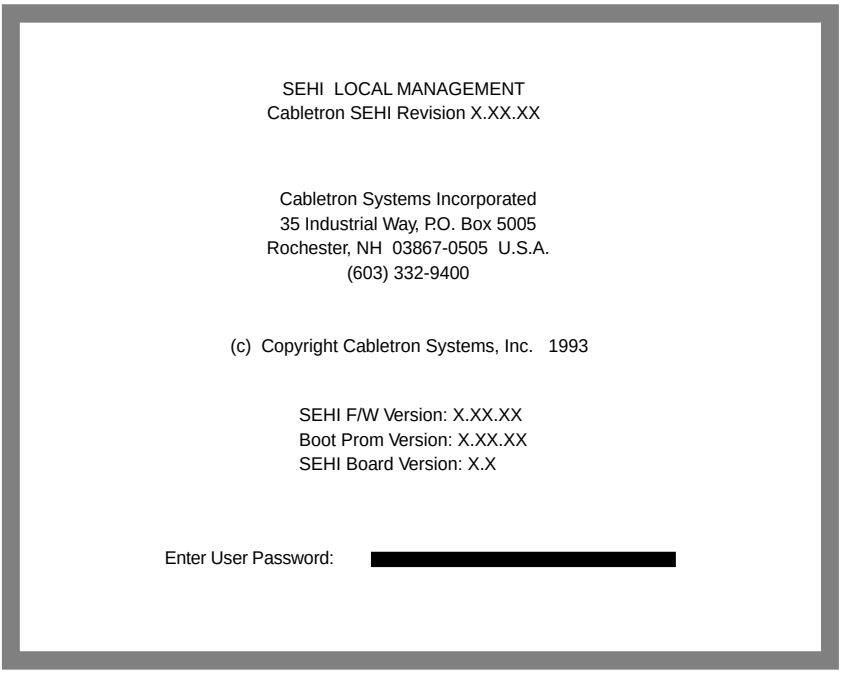


Figure 7-2 Password Screen

2. Enter the Password. The factory default password for Super-User access is “public” or press ENTER.

The password is one of the community names specified in the Community Name Table. Access to certain Local Management capabilities depends on the degree of access accorded that community name. Refer to Section 7.5 for more details about community names.

3. Press ENTER.

   - If the password entry is invalid, the cursor returns to the beginning of the password entry field.
   - If the password is valid, the associated access privilege appears briefly, then the Feature Selection screen (Figure 7-3) appears.

If the terminal keyboard is not used for 15 minutes, the Local Management session ends and the screen defaults to the Password screen.

7.4 THE FEATURE SELECTION SCREEN

The Feature Selection screen is the main menu screen for SEHI Local Management. There are five screen options in the Feature Selection screen: Community Name Table, IP Address Assignment, Component Trap Table, SNMP Tool Support, and Device Statistics. Use the arrow keys to highlight an option, then press ENTER (or press the corresponding Function key). The selected screen appears.

To exit your Local Management session, use the arrow keys to highlight the **EXIT LIM SERVICE** command, then press ENTER.

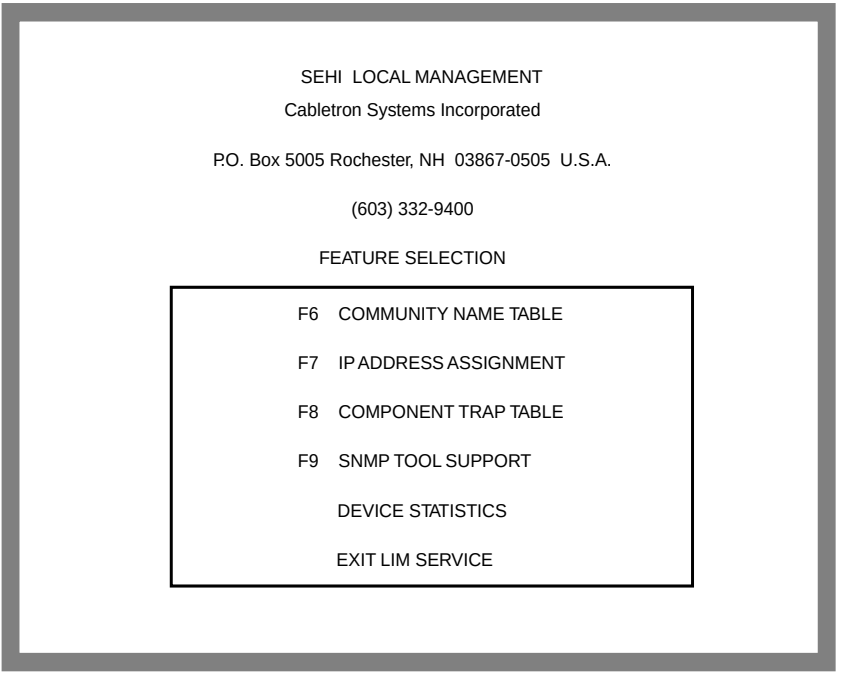


Figure 7-3 Feature Selection Screen

7.5 THE COMMUNITY NAME TABLE SCREEN

To access the Community Name Table screen from the Feature Selection screen, use the arrow keys to highlight the **Community Name Table** option, then press ENTER or F6. The Community Name Table screen shown in Figure 7-4 appears.

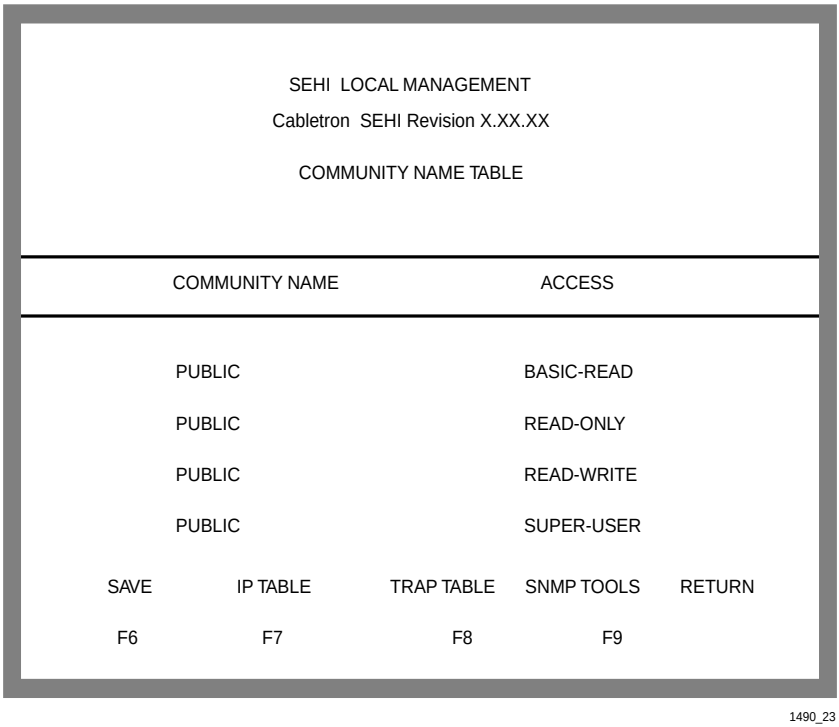


Figure 7-4 Community Name Table Screen

Community names are set through the Community Name Table option. Community names are passwords to Local Management and are agents of security control to the SEHI. SEHI access is controlled by establishing up to four different levels of security authorization: Basic-Read, Read-Only, Read-Write, and Super-User.

With Super-User access, the user changes the existing passwords by changing the community names. Only the community name assigned Super-User access has full management privileges.

The following sections explain each field on the Community Name Table screen and provides instructions on how to change them.

COMMUNITY NAME

Displays the user-defined name through which a user can access Local Management for the SEHI. Any community name assigned here acts as a password to Local Management.

ACCESS

Indicates the access status accorded each community name. The following conditions are possible:

Basic-Read	This allows Read-Only access to Local Management, but excludes read privileges to the Component Trap screen.
Read-Only	This allows Read-Only access to Local Management, but excludes access to security protected fields of the upper levels of authorization (Read-Write or Super-User).
Read-Write	This allows the user to read and write to Local Management fields, excluding IP Address, Subnet Mask, and Community Names.
Super-User	This access privilege gives the user read and write access to Local Management. Super-User allows read and write access to all modifiable parameters including Community Names, IP Addresses, Traps, and SNMP Objects.

7.5.1 Editing the Community Name Field

The password used to access Local Management at the Password screen must have Super-User privileges for the edits to take effect. If a password is entered with Basic-Read, Read-Only, or Read-Write privileges, Local Management displays the message "AUTHORIZATION PROHIBITS ACCESS", and does not include editing capabilities.

Use the following steps to edit the Community Name field:

1. Use the arrow keys to highlight the **Community Name** field adjacent to the desired access level.
2. Enter the community name (maximum of 32 characters) into the field.
3. Press ENTER.
4. Repeat steps 1 through 3 for editing any of the other community names.
5. Use the arrow keys to highlight the SAVE command at the bottom of the screen, then press ENTER or F6. The "SAVED OK" message appears indicating that the edits have been saved to memory.

The first time a user attempts to exit the screen without saving the changes, a "NOT SAVED?" message is displayed. The edits are lost if the user proceeds to exit without saving the changes.

6. To exit the screen, press the appropriate Function key or use the arrow keys to highlight the **RETURN** command.
7. Press ENTER. The Feature Selection screen appears.

7.6 THE CONFIGURATION SCREEN

To access the Configuration screen from the Feature Selection screen, use the arrow keys to highlight the **IP Address Assignment** option, then press ENTER or F7. The screen shown in Figure 7-5 appears.

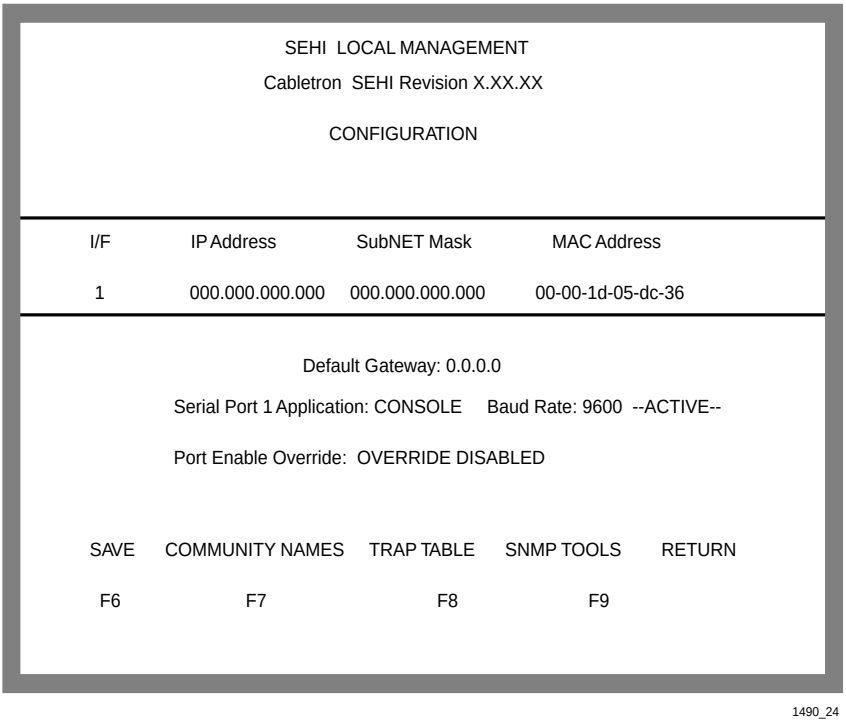


Figure 7-5 Configuration Screen

Assign the IP Address, Subnet Mask, and Default Gateway through the SEHI Configuration screen. Use the Port Enable Override option to enable all device ports in the stack. This option overrides the Port Disable setting in the Statistics screen.

The following sections explain each field on the Configuration screen and instructions on how to change them.

I/F

The number of the interface corresponding to the channels over which packets with that IP Address pass. On the SEHI, this value is always 1.

IP Address
Displays the IP address of the SEHI.

SubNET Mask
Displays the subnet mask for the SEHI. A subnet mask is a 32-bit quantity which "masks out" the network bits of the IP address. This is done by setting the bits in the mask to 1 when the network treats the corresponding bits in the IP address as part of the network or subnetwork address, or to 0 if the corresponding bit identifies the host.

MAC Address
Displays the physical address associated with the interface.

Default Gateway
Displays the default gateway for the SEHI. This field is not defined until an appropriate value is entered. The default gateway identifies the default gateway device that will forward packets to other IP subnetworks.

Serial Port 1 Application
Displays the port's application setting as CONSOLE.

Baud Rate
Displays the Baud Rate setting of the device attached to the SEHI through the serial port. The setting for the serial port is 9600.

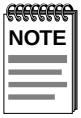
Port Enable Override
This command lets the user override the Disable Port settings in the Device Statistics screen to enable all ports in the stack.

7.6.1 Setting the IP Address

Use the following steps to set the IP address:

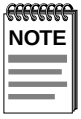
1. Use the arrow keys to highlight the **IP Address** field.
2. Enter the IP address into this field. The format for this entry is XXX.XXX.XXX.XXX, with values for XXX being from 0 to 255. The screen beeps if non-numerics or adjacent dots are entered. If the entry does not have three dots it will be rejected.
3. Press ENTER. The IP address appears and the natural subnet mask for the user is generated and also appears.

4. Use the arrow keys to highlight the **SAVE** option, then press ENTER or F6. The "SAVED OK" message appears indicating that the changes have been saved to memory.



The first time an attempt is made to exit the screen without saving the changes, a "NOT SAVED?" message is displayed. The edits are lost if the user proceeds to exit without saving the changes.

7.6.2 Setting the Subnet Mask



Consult the Network Administrator prior to setting the Subnet Mask.

The subnet mask defines how the SEHI treats SNMP Trap IP destination addresses in its Trap Table.

- Set the subnet mask when workstations in the Trap Table reside on a different subnet (i.e., across a gateway or router), and these workstations are to receive SNMP traps.
- Use the subnet mask factory default setting of 0.0.0.0 when all trap designated workstations are on the SEHI subnet.

Use the following steps to set the subnet mask:

1. Use the arrow keys to highlight the **SubNET Mask** field.
2. Enter the subnet mask into this field. The format for this entry is XXX.XXX.XXX.XXX with values for XXX being from 0 to 255.
3. Press ENTER.
4. Use the arrow keys to highlight the **SAVE** option, then press ENTER or F6. The "SAVED OK" message appears indicating that the changes have been saved to memory.

The first time an attempt is made to exit the screen without saving the changes, a “NOT SAVED?” message is displayed. The edits are lost if the user proceeds to exit without saving the changes.

7.6.3 Setting the Default Gateway

The Default Gateway field allows the user to describe the router through which the SEHI will be forwarding IP packets.

Use the following steps to set the Default Gateway:

1. Use the arrow keys to highlight the **Default Gateway** field.
2. Enter the gateway’s default mask in this field. The format for this entry is XXX.XXX.XXX.XXX with values for XXX being from 0 to 255.
3. Press ENTER. If your entry is accepted as a valid default gateway, “OK” appears to the right of the field.
4. Use the arrow keys to highlight the **SAVE** option, then press ENTER or F6. The “SAVED OK” message appears indicating that the changes have been saved to memory.

7.6.4 Using the Port Enable Override

Use the following steps to override the Disable Port settings:

1. Use the arrow keys to highlight the **Port Enable Override** field.
2. Press ENTER to toggle from the default setting of “OVERRIDE DISABLED” to “OVERRIDE ENABLED”.
3. The adjacent field displays “Y/N”. Enter **Y** to continue enabling all of the ports, or **N** to discontinue the port enable override. The message “PORT ENABLED” appears after **Y** is entered.

7.6.5 Exiting the Configuration Screen

Use the following steps to exit the Configuration screen and return to the Feature Selection screen:

1. Press the appropriate Function key. To return to the Feature Selection screen, use the arrow keys to highlight the **RETURN** command.
2. Press ENTER. The Feature Selection screen appears.

7.7 THE TRAP TABLE SCREEN

Access the Trap Table screen from the Feature Selection screen using the arrow keys to highlight the **Component Trap Table** option, then press ENTER or F8. The screen shown in Figure 7-6 appears.

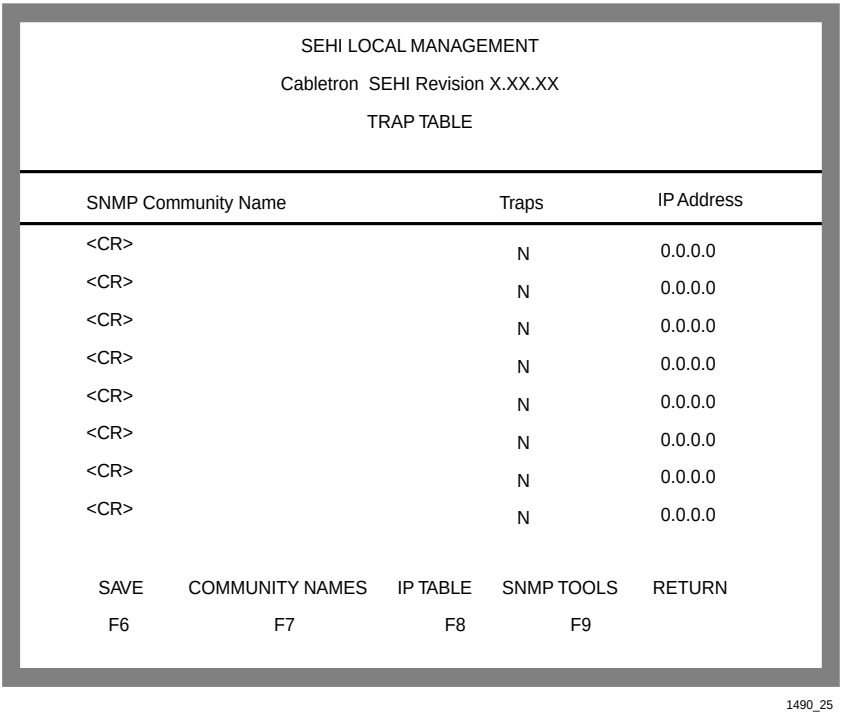


Figure 7-6 Trap Table Screen

The Trap Table defines the management stations that receive SNMP Traps for alarm/event notification. The following sections explain each field on the Trap Table screen and provide instructions on how to change them.

SNMP Community Name
Displays the community name included in the trap message sent to the Network Management Station with the associated IP address.

Traps
Enables transmission of the traps to the network management station with the associated IP address.

Trap IP Address
Indicates the IP address of the workstation to receive trap alarms from the SEHI.

7.7.1 Configuring the Trap Table

Use the following steps to configure the Trap Table:

1. Use the arrow keys to highlight the **SNMP Community Name** field, then enter the community name.
2. Press ENTER.
3. Use the arrow keys to highlight the **Traps** field and enter **Y** to send alarms from the SEHI to the workstation, or **N** to prevent alarms from being sent.
4. Press ENTER.
5. Use the arrow keys to highlight the appropriate **Trap IP Address** field.
6. Enter the IP address of the workstation that you want to send traps to in this field. The format for this entry is XXX.XXX.XXX.XXX, with the value of XXX ranging from 0 to 255, and three dots, or else it returns to the beginning of the field.
7. Use the arrow keys to highlight the **SAVE** option, then press ENTER or F6. The "SAVED OK" message appears indicating that the changes have been saved to memory.

The first time an attempt is made to exit the screen without saving the changes, a "NOT SAVED?" message is displayed. The edits are lost if the user proceeds to exit without saving the changes.

7.7.2 Exiting the Trap Table Screen

Use the following steps to exit the Trap Table screen and return to the Feature Selection screen:

1. Press the appropriate Function key. To exit to the Feature Selection screen, use the arrow keys to highlight the **RETURN** command.
2. Press ENTER. The Feature Selection screen appears.

7.8 THE SNMP TOOLS SCREEN

This section describes how to use the SNMP Tools screen to access Management Information Bases (MIBs). Access to screen options depends on the access status accorded to the user's community name. This section describes Super-User management capabilities.

SNMP Tools allows access to valuable MIB information. The user gets information about specific object identifiers (OIDs), edit the values of configurable OIDs, and request the OID numerically sequential to the originally requested OID.

Other ways to view OIDs from the SNMP Tools screen include Walking, Stepping, and Cycling. Walk and Cycle let the user review several OIDs at a time.

To access the SNMP Tools screen from the Feature Selection screen, use the arrow keys to highlight the **SNMP Tools Support** option, then press ENTER or F9. The SNMP Tools screen shown in Figure 7-7 appears.

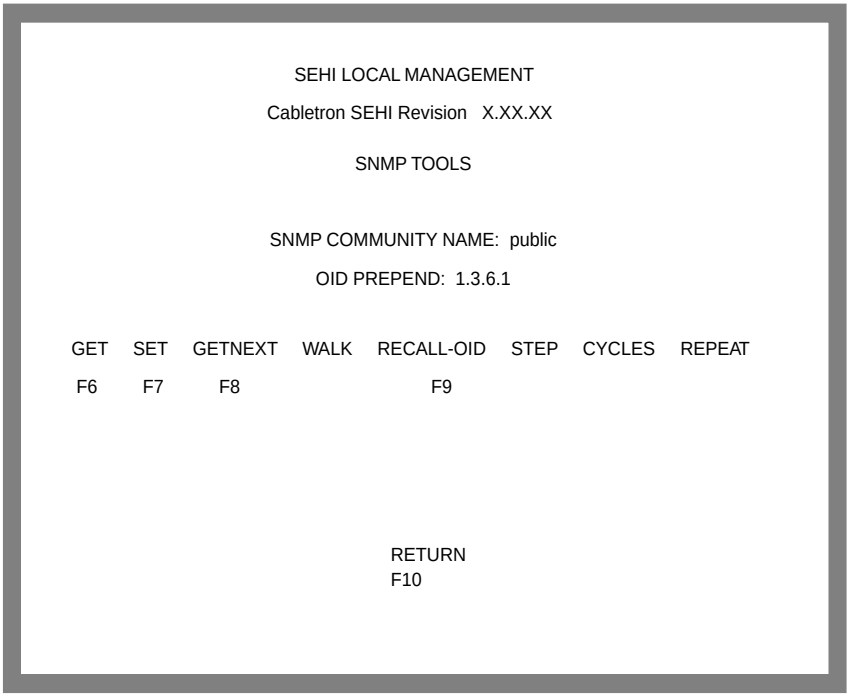


Figure 7-7 SNMP Tools Screen

The following sections describe SNMP Tools screen fields.

SNMP COMMUNITY NAME
Identifies the community name used as a password to determine access level to the MIB component.

OID PREPEND
Specifies the number prefix common to all Object Identifiers (OIDs) found in the MIBs – 1.3.6.1 is the default prefix OID. This is a modifiable field.

GET
Lets you retrieve MIB objects using SNMP protocol.

SET
Allows users with Read-Write and Super-User access to change modifiable MIB objects, using SNMP protocol.

GETNEXT
Displays the OID following the current OID.

WALK
Allows the user to scroll through a section of the MIB leaf by leaf, from a user-specified object identifier. Leaves are the sections of the OID separated by periods. When a walk is initialized, the following categories for each walk entry, or step are displayed.

- Specified OID – gives the number tag for that OID.
- Size – identifies the number of bytes it takes to store that object.
- Type – specifies the variable type of the object (e.g., int = integer).
- Data – displays what the object identifier represents.

RECALL-OID
Recalls, from memory, the last OID used.

STEP
Displays the MIB walk, step by step, giving the user time to view specific leaves in detail.

CYCLES
Allows the user to specify the number of GETNEXT requests to cycle through and how much time will elapse between each request.

REPEAT
Repeats the last GET command, allowing the user to monitor changes to a specific OID.

7.8.1 Getting Individual OIDs

Use the following steps to GET an OID:

1. Highlight **GET**, using the arrow keys, then press ENTER or F6. "<GET> OID (=|F9)" appears.
2. Use one of the following options to enter the OID:
    - Enter the OID minus the prepend (e.g., if the prepend is 1.3.6.1, and 4.1.3 is entered, then the OID=1.3.6.1.4.1.3).

- Enter an "=" and the OID suffix (e.g., if =4.1.3 is entered, then the OID=4.1.3). This allows the user to not use the prepend.
- Press F9 to recall an OID already entered. The user can then use the keyboard to modify the recalled OID as necessary.

3. Press ENTER. If there is no instance of that OID, the return code specifies "MIB_NO_INSTANCE", otherwise, information about the data type, length, and value of that OID appears.

7.8.2 Getting the Next OID

Use the following steps to GET the next OID:

1. Highlight **GETNEXT** with the arrow keys, then press ENTER or F8. "<GETNEXT> OID (=|F9)" appears.
2. Enter the desired **OID**, or OID extension. (Press F9 to recall the last OID request. The recalled OID may then be modified as necessary.)
3. Press ENTER. If there is no instance of that OID, the return code specifies "MIB_NO_INSTANCE", otherwise, information about the data type, length, and value of that OID appears.

7.8.3 Setting an OID

Use the following steps to SET an OID:

1. Highlight **SET** by using the arrow keys, then press ENTER or F7. "<SET> OID (=|F9)" appears.
2. Enter the OID, minus the OID prepend. If the OID was previously entered, pressing F9 recalls that entry. The arrow keys may be used to modify the recalled OID if necessary.

3. Press ENTER. If there is no instance of that OID, the return code will specify “MIB_NO_INSTANCE”, otherwise “DATA TYPE:” appears.
4. Enter the data type for that OID. The following are possible choices: integer, string, null, OID, IP address, counter, gauge, timeticks, and opaque.
5. Press ENTER. “DATA” appears.
6. Enter the value to correspond to the OID. If accepted, “<SET> OPERATION CODE: XXXX <OK>” appears, otherwise, an error message appears.

7.8.4 Viewing Multiple OIDs

Viewing several object identifiers at one time allows the user to quickly scan a MIB for the specific information that is needed. The WALK command scrolls through OIDs numerically sequential to the initial OID request. The STEP command scrolls the MIB Walk, one OID at a time. Cycling allows you to specify how many GETNEXT commands to cycle through for one OID. The REPEAT command allows you to enter an OID and repeatedly get and display that OID for monitoring purposes.

7.8.5 Walking Through OIDs

Use the following steps to WALK through an OID:

1. Highlight **WALK**, using the arrow keys, then press ENTER. “<INITIAL> OID (=|F9)” appears.
2. Enter the OID (minus the prepend) and press ENTER. The screen will begin walking through the sublayers of the MIB available from the specified OID. Each OID listed displays the specified OID, its size, its type, and the data it contains.
3. Press the SPACE bar to stop the walk, or wait for “***MIB WALK COMPLETED***” to appear on the screen.

7.8.6 Stepping Through OIDs

Use the following steps to STEP through OIDs (the user can step through only after a GETNEXT):

1. Highlight **STEP**, using the arrow keys, then press ENTER. “Specify OID” appears.
2. Enter the OID (only the suffix is necessary) and press ENTER. The Tools screen begins to scroll one OID at a time, through all of the sublayers of the MIB available for that OID.

7.8.7 Cycling Through OIDs

Use the following steps to CYCLE through an OID:

1. Use the arrow keys to highlight **CYCLES**, then press ENTER.
2. Enter the number of cycles desired to occur after “ENTER CYCLE COUNT:”, then press ENTER.
3. Enter how many seconds delay desired between get next requests after “ENTER CYCLE DELAY (secs):”, then press ENTER.

7.8.8 Repeating the Last OID

Use the following steps to continuously REPEAT an OID for monitoring purposes:

1. Use the arrow keys to highlight **CYCLES**, then press ENTER.
2. Enter the OID to be repeated and press ENTER.
3. The GET command for the OID is repeated so the OID is repeatedly displayed along with a running count at regular intervals. Press the SPACE bar to stop the process.

7.8.9 Exiting the SNMP Tools Screen

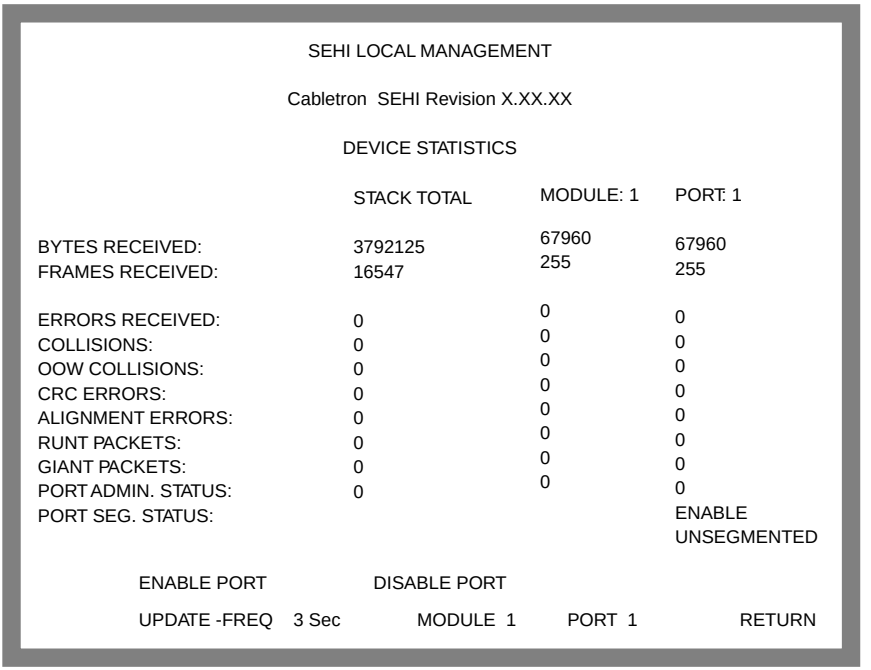
To exit the SNMP Tools screen:

1. Use the arrow keys to highlight the **RETURN** command.
2. Press ENTER. The Feature Selection screen appears.

7.9 THE DEVICE STATISTICS SCREEN

This section describes the features of the Device Statistics screen. The user can view error, collision, and traffic statistics for the stack, a selected module, or a selected port. The user can also enable and disable ports.

To access the Device Statistics screen from the Feature Selection screen, use the arrow keys to highlight the **Device Statistics** option, then press ENTER. The Device Statistics screen shown in Figure 7-8 appears.



1490_27

Figure 7-8 Device Statistics Screen

The following sections describe Device Statistics screen fields and provide instructions on how to change them.

BYTES RECEIVED

Displays the number of bytes received.

FRAMES RECEIVED

Displays the number of frames received.

ERRORS RECEIVED
Displays the number of errors received.

COLLISIONS
Displays the number of collisions received.

OOW COLLISIONS
Displays the number of Out Of Window collisions. OOW collisions are usually caused by one or more of the following:

- The network being too long due to the round trip propagation delay being greater than 5.12 μs (the collision domain is too large).
- A station somewhere on the network is violating Carrier Sense and is transmitting at will.
- A cable somewhere on the network failed during the transmission of the packet.

CRC ERRORS
Displays the number of packets with bad Cyclic Redundancy Checks (CRC) that have been received from the network. The CRC is a 4-byte field in the data packet that ensures that the transmitted data that is received is the same as the data that was originally sent.

ALIGNMENT ERRORS
Displays the number of errors due to misaligned packets.

RUNT PACKETS
Displays the number of runt packets received from the network. A runt packet is less than the minimum Ethernet frame size of 64 bytes, not including preamble.

GIANT PACKETS
Displays the number of packets received that exceed 1518 data bytes, not including preamble.

PORT ADMIN. STATUS
Displays the administrative status of the port selected. The two possible status messages are Enable or Disable.

PORT SEG. STATUS
Displays the segmentation status of the port selected. The two possible status messages are Segmented or Unsegmented. The SEHI and SEH automatically partition problem segments, and reconnect non-problem segments to the network.

ENABLE PORT
This command lets the user enable the selected port.

DISABLE PORT
This command lets the user Disable the selected port.

UPDATE-FREQ
This command lets the user select the time interval between Stack/Module/Port counter updates. Choose update intervals in increments of 3 seconds, with the maximum interval being 99 seconds.

MODULE
This command lets the user view statistics for a selected module in the stack. The SEHI is Module 1 and each SEH in the stack follows in sequential order. Figure 7-9 shows each module number in the stack.

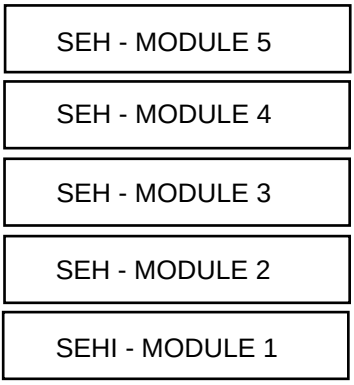


Figure 7-9 Module Number Sequence

PORT
Allows the user to view statistics for ports 1–24 of the selected module.

7.9.1 Selecting the Appropriate Module/Port

When the Device Statistics screen first appears, statistics are displayed for Module 1 and Port 1. View statistics for another module and port by using the **Module x** or **Port x** commands at the bottom of the screen.

Use the following steps to select a module or port:

1. Use the arrow keys to highlight the Module or Port command.
2. Press the SHIFT and + or – keys until the desired module or port number appears.
3. Press ENTER. The selected Module and Port statistics appear.

7.9.2 Using the ENABLE PORT Command

The ENABLE PORT command lets the user enable the selected port. The user must first use the **PORT** command to select the desired port.

Use the following steps to set the ENABLE PORT command:

1. Use the arrow keys to highlight the **ENABLE PORT** command at the bottom of the screen.
2. Press ENTER. The corresponding port is enabled and the Port Admin Status field is updated.

7.9.3 Using the DISABLE PORT Command

The DISABLE PORT command lets the user disable the port selected in the PORT command. The user must first use the PORT command to select the desired port.

Use the following steps to set the DISABLE PORT command:

1. Use the arrow keys to highlight the **DISABLE PORT** command at the bottom of the screen.
2. Press ENTER. The corresponding port is disabled and the Port Admin Status field is updated.

7.9.4 Setting the UPDATE-FREQency Field

This field changes the time interval between Stack/Module/Port counter updates. Use the following steps to set the update frequency:

1. Use the arrow keys to highlight the **UPDATE-FREQ** command at the bottom of the screen.
2. Use the + or – key to increase or decrease the time in 3-second increments until the appropriate time is displayed.
3. Press ENTER. The displayed time is saved.

7.9.5 Exiting the Device Statistics Screen

Use the following steps to exit the Device Statistics screen and return to the Feature Selection screen:

1. Use the arrow keys to highlight the **RETURN** command at the bottom of the screen.
2. Press ENTER. The Feature Selection screen appears.

APPENDIX A
EPIM SPECIFICATIONS

A.1 EPIM SPECIFICATIONS

EPIMs enable the connection of the SEHI to the network using different media types.The SEHI100TX-22 supports the EPIM-100TX, EPIM-100FX, and the EPIM-100FMB. This appendix provides the specifications for each EPIM.

A.1.1 EPIM-100TX

The EPIM-100TX is an RJ45 connector supporting Unshielded Twisted Pair (UTP) cabling.

The slide switch on the EPIM-100TX determines the crossover status of the cable pairs. If the switch is on the **X** side, the pairs are internally crossed over. If the switch is on the = side, the pairs are not internally crossed over. Figure A-1 shows the pinouts for the EPIM-100TX in both positions.

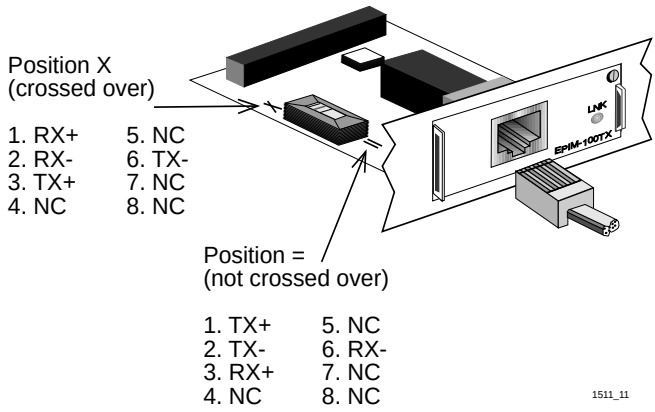


Figure A-1 EPIM-100TX Pinouts

A.1.2 EPIM-100FX

The EPIM-100FX shown in Figure A-2 supports Multimode Fiber Optic cabling. The EPIM-100FX is equipped with an SC style connector. Specifications for the EPIM-100FX are listed in Table A-1.

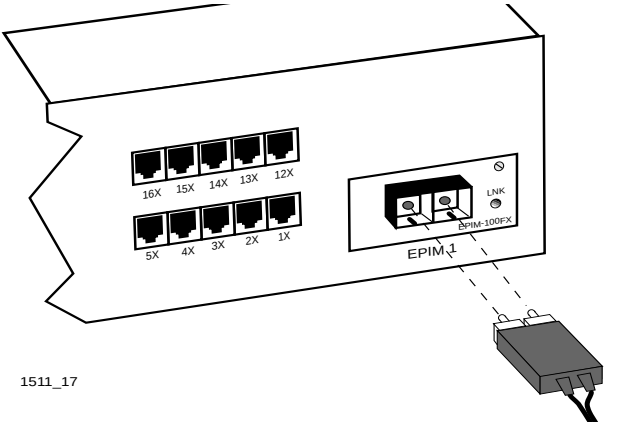


Figure A-2 EPIM-100FX

Table A-1 Transmitter Power (EPIM-100FX)

Cable Type	Worst Case Budget	Typical Budget
50/125 µm fiber optic	6.0 dB	9.0 dB
62.5/125 µm fiber optic	9.0 dB	12.0 dB
100/140 µm fiber optic	15.0 dB	18.0 dB

The transmitter power levels and receive sensitivity levels listed are peak power levels after optical overshoot. A peak power meter must be used to correctly compare the values given above to those measured on any particular port. If power levels are being measured with an average power meter, add 3 dBm to the measurement to compare the measured values to the values listed above.

A.1.3 EPIM-100FMB

The EPIM-100FMB shown in Figure A-3 supports multimode fiber optic cabling and has an SC style connector.

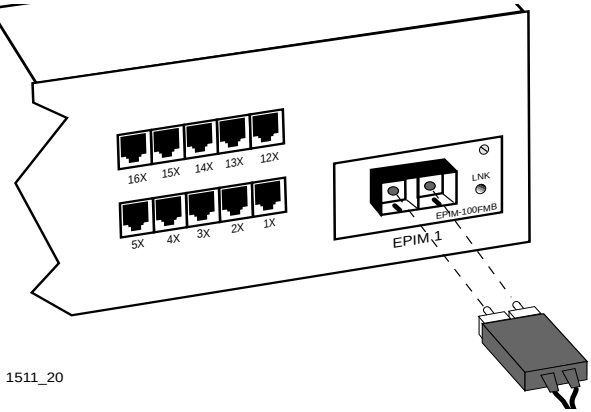


Figure A-3 EPIM-100FMB

The EPIM-100FMB acts as a non-filtering bridge. Its purpose is to extend the Broadcast Domain of a shared access 100BASE-T LAN, so that a full length of fiber optic cable can be used to reach the next domain or more typically to a switch port.

The maximum diameter of a 100BASE-T collision domain using UTP cable to the desktop and fiber cable in the next domain or switch port is only 263 meters (100 meters of UTP and 163 meters of fiber optics). There are circumstances where the maximum fiber optic cable length of 163 meters does not meet some requirements such as in the cabling of high rise buildings or campus environments. The EPIM-100FMB helps meet these requirements by extending the maximum fiber optic cable length that can be used from 163 meters to 400 meters.

Table A-2 provides the specifications for the EPIM-100FMB.

Table A-2 Transmitter Power (EPIM-100FMB)

Cable Type	Worst Case Budget	Typical Budget
50/125 μm fiber optic	6.0 dB	9.0 dB
62.5/125 μm fiber optic	9.0 dB	12.0 dB
100/140 μm fiber optic	15.0 dB	18.0 dB

The transmitter power levels and receive sensitivity levels listed are peak power levels after optical overshoot. A peak power meter must be used to correctly compare the values given above to those measured on any particular port. If power levels are being measured with an average power meter, add 3 dBm to the measurement to compare the measured values to the values listed above.

APPENDIX B
IMAGE FILE DOWNLOAD USING OID STRINGS

This appendix provides instructions for setting up a TFTP server and to download an image file to the SEHI by setting specific MIB OID strings. Set the OID strings with the SNMP Tools screen described in Chapter 7.

Download an image file to the SEHI with a remote management package such as SPECTRUM, SPECTRUM Element Manager, or the appropriate SPECTRUM Portable Management Application. Refer to the specific package documentation for image file download procedures.

The SEHI supports the Standard Local Download application. In this application the SEHI automatically disables management while download of the new firmware image is in progress.

Before downloading the image to a device, you must do the following:

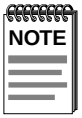
- Load the image file onto your network TFTP server.

For information on how to set up a workstation as a TFTP server, refer to your specific workstation documentation and the guidelines outlined in this instruction guide.

- Decompress the image file.

B.1 SETTING UNIX WORKSTATION AS TFTP SERVER

Downloading an image file requires setting up your UNIX workstation as a TFTP server.



Due to variations between UNIX systems, and individual configurations, this section provides only GUIDELINES for configuring a UNIX workstation to perform an image file download. The instructions include command examples, where appropriate. Bold lettering in examples indicates operator entry.

If unsure about how to properly configure your UNIX workstation using these guidelines, contact your Systems Administrator.

Use the following steps to set up a UNIX workstation:

1. If you already have a /tftpboot directory, confirm the TFTP setup of your workstation as follows:

   Request a process status and grep for TFTP (e.g., unix% **netstat -a | grep tftp**).

   The following information represents a typical output:

   ```
   user   161  7.7  1.2  32  184  p3  S  12:00  grep tftp
   root    87  0.0  0.9  48  136  ?   S  11:05  tftp -s
   ```

   The term tftp -s, located at the end of the root string, indicates TFTP is active. If TFTP is NOT running, only the grep process appears.

2. If you do NOT have a /tftpboot directory, then create one (e.g., unix% **mkdir tftpboot**).
3. Ensure that the /tftpboot directory is not owned (e.g., unix% **chown nobody tftpboot**).

4. Store the hex image file in the /tftpboot directory as sehi.hex.

This step requires decompression of the zipped image file. If you do not have a UNIX unzip utility, access to a PC with pkunzip, or a way to FTP the decompressed image to a UNIX workstation, contact Cabletron Systems Technical Support.

5. Edit the /etc/inetd.conf file by removing anything prior to the tftpboot daemon (e.g., the # sign) that comments-out the line.
6. Kill the inetd process (e.g., unix% **kill -HUP 'process ID number'**), and then restart the process (e.g., unix% **inetd**), to enable the revised inetd.conf file.

You must request a process status and grep for inetd to obtain the process ID number (refer back to step 3 in this procedure).

B.2 STANDARD LOCAL DOWNLOAD

Table B-1 provides a step-by-step procedure for downloading the firmware image file. This section provides specific MIB OIDs, their names, and the required setting for proper image file download. Refer to your specific MIB walking tool documentation for instructions on how to set MIB OID strings.

The Download OIDs for Cabletron Systems products reside in the Cabletron Systems enterprise MIBs (group 52). The specific OIDs necessary to perform an image file download reside in the common download group under ctDL (Cabletron Download). The full OID string to reach this group is: 1.3.6.1.4.1.52.4.1.5.8.1

When performing the steps in Table B-1, keep the following in mind:

- You must follow the steps in order.
- Enter the IP address of the TFTP server in standard dotted decimal notation (e.g., 132.177.118.24).
- Enter the FULL path to the image file in the ctDLTFTPRequest OID, including the name of the image file (e.g., c:\tftpboot\sehi.hex).

Table B-1 OIDs and Settings

Step	OID Name	OID Number	Data Type	SNMP OID Data
1.	ctDLForceOnBoot	1.3.6.1.4.1.52.4.1.5.8.1.**1.0**	integer	1
2.	ctDLCommitRAMToFlash	1.3.6.1.4.1.52.4.1.5.8.1.**2.0**	integer	1
3.	ctDLTFTPRequestHost	1.3.6.1.4.1.52.4.1.5.8.1.**4.0**	IP address	Enter the IP address of the TFTP server.
4.	ctDLTFTPRequest	1.3.6.1.4.1.52.4.1.5.8.1.**5.0**	string (ASCII)	Enter the path to the image file.
5.	ctDLInitiateColdBoot	1.3.6.1.4.1.52.4.1.5.8.1.**3.0**	integer	1

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POWER SUPPLY CORD

The mains cord used with this equipment must be a 2 conductor plus ground type with minimum 0.75 mm square conductors and must incorporate a standard IEC appliance coupler on one end and a mains plug on the other end which is suitable for the use and application of the product and that is approved for use in the country of application.

GERMAN:

Die Netzleitung, die mit diesem Geraet benuetzt wird, soll einen zwei Leiter mit Erdleiter haben, wobei die Leiter mindestens 0.75 mm sind, mit einer normalen IEC Geraetesteckdose an einem Ende und einem Geraetestecker am anderen Ende versehen sind, der fuer den Gebrauch und die Anwendung des Geraetes geeignet und der zum Benuetzen im Lande der Anwendung anerkannt ist.

SPANISH:

El cable principal de la red eléctrica utilizado con este equipo debe tener 2 conductores y 1 toma de tierra con un mínimo de 0.75 mm2 cada uno y necesita tener un aparato de acoplamiento standard IEC en un extremo y un enchufe para el cable principal de la red eléctrica en el otro extremo, lo cual sea adecuado para el uso y applicación del producto y lo cual sea aprobado para uso en el pais de applicación.

FRENCH:

Le cordon d' alimentation reliant cet appareil au secteur doit obligatoirement avoir deux fils conducteurs de 0.75 mm2 minimum et un fil de terre. It doit également être équipé du côté appareil d'une fiche agrée IEC et du côte secteur, d'une prise adaptée à l'usage du produit et aux normes du pays où l'appareil est utilisé.